

SUSTAINABLE GOAT PRODUCTION: MEAT GOATS

LIVESTOCK PRODUCTION GUIDE

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This publication offers information specific to meat goat production, and should be read after the companion publication, *Sustainable Goat Production: Overview*. The overview discusses general pasturing of goats, supplemental feeding, diseases and parasites, management, marketing, and resources.

Related ATTRA Publications

Sustainable Goat Production: Overview
Sustainable Goat Production: Dairy Goats
Sustainable Goat Production: Cashmere Goats
Sustainable Goat Production: Mohair Goats
Multispecies Grazing

INTRODUCTION

The increasing economic importance of meat goat production in the U.S. can be attributed both to a strong demand for goat meat and to an interest in ecologically sound forms of vegetation control. Many ethnic groups—including Hispanic, Muslim, and Caribbean peoples—enjoy goat meat, called “chevon” by some and “cabrito” by others. Demand is currently about double the domestic production, so there is ample room for expansion. Meat goats fit in well with other enterprises, particularly cattle operations, and may be used to control noxious weeds and brush to improve pastures for other livestock.

Meat goats can be raised with very little supplemental grain and with minimal shelter, and are generally an easy-care animal. The key management issues for a successful meat goat

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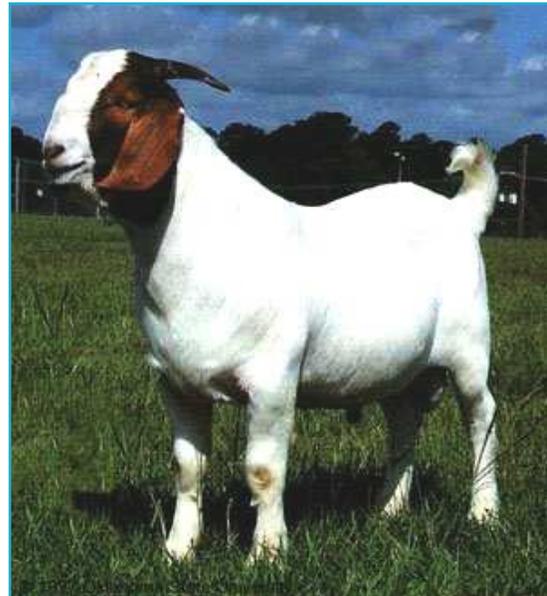


Photo courtesy of the Department of Animal Science,
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enterprise are fencing, parasite control, predator control, and marketing. Attention must also be paid to nutrition and to breeding stock selection. While goats are enjoyable to raise and may be profitable, they are not a way to “get rich quick.” As with any farming endeavor, knowledge and skills are essential for success. Prospective producers are well advised not only to read up on the subject, but to find and spend time with a local meat goat producer, and ask lots of questions.

BEGINNING A MEAT GOAT ENTERPRISE

Before committing themselves to meat goat production, prospective producers should investigate market conditions, estimate costs, and work out a rough budget. In some areas, land and feed costs will be higher, increasing the cost of production; in some areas, lack of demand for meat or kids will make marketing more difficult. Economic feasibility will be enhanced if the meat goat enterprise uses land already owned but not fully utilized, such as brushy land on a cattle farm. The presence of a local ethnic population is a plus, as is proximity to processing plants that handle goats.

If the financial prospects are encouraging and the decision is made to proceed, the next step is to install adequate fencing. Cattle fences may be adapted for goats by adding strands of barbed wire (and stays) or by installing offset hot wires inside the fence at about 8 inches high and 6 to 8 inches away from the fence. Fences must be tight, and attention must be paid to areas with uneven terrain, as gaps can allow goats to squeeze underneath and escape. Goats must be trained to electric fencing, and charges should be maintained at a minimum of 4,000 volts. Eight strands of tight barbed wire or five strands of high-tensile electric or woven wire 47” high (topped with barbed wire and with another strand of barbed wire at ground level) will make a good fence. The woven wire should have vertical stays 10 or 12 inches apart, rather than 6 or 8 inches. This is to allow horned goats to avoid entrapment (Harwell and Pinkerton, 2000). Be aware that the larger spacing will allow weanlings to slip through, unless there are offset hotwires attached to the fence.

Housing needs for meat goats are very simple, and in moderate climates may consist



of natural cover such as thick trees and brush or rock ledges. Goats do need protection from rain and from cold wind and snow. A sturdy shed, open to the south, with rear eave height of 4 to 6 feet and front eave height of 6 to 8 feet will help conserve body heat. (The shed will be more difficult to clean out if the roof is this low, however.) For night shelter, allow 5 square feet per goat. If the shed is near the farmhouse, predators may be deterred. One problem with a permanent shed is that constant traffic will keep the ground bare, leading to erosion. A movable shed (on skids) is one possible remedy.

In addition to a shed, it will be helpful to have a sturdy catch pen, at least 4 feet tall. This pen is essential when handling the goats for deworming, vaccinations, foot trimming, and sorting. Larger operations will benefit from additional facilities. Dr. Lynn Harwell recommends a working chute, a squeeze chute (headgate), and an alley system:

A working chute should be about ten feet long, four feet high, and 12” wide. Longer chutes tend to cause crowding and trampling at the forward end, and should be divided into sections with sliding gates. Also, a series of canvas flaps suspended about halfway down into the chute keeps the goats’ heads down and eliminates riding. The sides should be solid. Ideally, for horned goats the chute should be tapered, with the top nearly twice the width of the bottom. To avoid jamming, it helps to mount a vertical roller, about 30 inches in length, at one side of the entrance to the chute. The crowding pen should

be half again as long as the working chute and up to 12 feet wide at the open end. (Harwell and Pinkerton, 2000)

Excellent information on goat behavior, as well as fencing, housing, working facilities, and predator control, may be found in the *Meat Goat Production and Marketing Handbook* at <<http://goats.clemson.edu>>.

SELECTION

Once finances, fences, abundant food sources (browse or pasture), and shelter are ready, it is time to acquire the goats. A small group of goats will provide many learning experiences in the first year or two, and may easily be expanded as expertise is gained. Since one buck (male) can easily service 25 to 50 does (females), that is a logical herd size to begin with. Of first importance is the health status of the animals, and it is a good idea to buy all your animals from one reputable breeder, if possible. Examine the entire herd, and be sure they have been managed the way you intend to manage them. Avoid limping animals (see *Sustainable Goat Production: Overview* for a discussion of footrot) and be sure to find out how the goats have been dewormed, and whether they have resistance to any dewormers. Other important features to check out before purchase are udders, teeth, hooves, and overall body structure. A goat should not be fat. The hair coat should look healthy and shiny. Hooves, teeth, and udders should be sound. Teeth are important for grazing and browsing, and are an indicator of age. Avoid buying animals with broken teeth, or with wide gaps between the teeth. Be aware that each set of mature teeth indicates one year of age; therefore, a doe with four sets of large teeth (eight teeth) is already at least four years old. This should be considered when negotiating price.

It's a good idea to examine the previous kid crop and to look at production records. Twinning percentage and kid survivability are important components of profitability. Weaning weights are also crucial, and indicate milking ability of the herd as well as growth potential of the kids. Does may kid at one year of age, but producers may choose to grow them out instead of breeding the first year. A doe should

certainly kid by two years of age, however. Goats raised "extensively" (on the range or in rough, brushy areas) may not have records. In that case, ask the producer about the kid crop and be alert for individuals with too much body condition (fat) relative to the others. The ones that look the best may be the ones that did not raise kids. Avoid those freeloaders!

BREEDS

Several meat-goat breeds are available in the U.S. The most widely available and the breed best suited to extensive range is the **Spanish** meat goat, also known as the "brush" goat. Most are horned; color and size are variable. Only horned bucks should be used, as naturally polled goats carry a gene for hermaphroditism. Spanish goats are characterized as hardy and adaptable, excellent foragers, and excellent mothers. However, their flighty disposition—if



Spanish goats

raised extensively—may make them hard to handle, and they are generally slower-growing and lighter-muscled than other types. Some lines of Spanish goats have been highly selected and will be far superior to the average.

Dairy breeds may be crossed with Spanish goats to produce a larger kid, and the resulting cross will produce more milk. However, the larger udders of the dairy breeds will cause problems in brushy areas (Mitchell, 1991). Dairy goats' nutritional requirements during lactation are very high, and therefore more supplemental feed will be needed to maintain milk production. Dairy breeds are much calmer than Spanish goats. Because they have been selected for milk production rather than carcass qualities, dairy breeds will not normally produce a

meaty carcass (with the exception of Nubians). However, their availability and price can offset the carcass characteristics, and crossbreeding with a Boer-type buck results in a desirable meat animal that is inexpensive to produce.

Angora goats may be raised successfully for meat. However, they are not adapted to cold climates, and are not as prolific as other goats. It is possible to raise them in northern areas—please refer to *Angora Goats the Northern Way*, by **Sue Drummond** (contact information listed below under **Further Resources**). Also see the ATTRA publication *Sustainable Goat Production: Mohair Goats*.

Boer goats can be very expensive, but they grow more rapidly, put on more meat, and have a calmer disposition than other breeds. They are easily recognized by their large, muscular white bodies and red heads. The Boer goat originated in South Africa, and was imported to the United States in 1993. Boer-Spanish crosses perform well, and using a Boer buck on a fine set of Spanish does is a good way to increase the muscle and growth of the kid crop without incurring excessive expense. Boers also cross well on dairy goats. Boer goats are very large; adult does weigh as much as 200 pounds. They will therefore require considerably more feed than other breeds. Boer-cross does are said to be excellent mothers and good milkers. In Montana, Boers have been crossed with cashmere goats, with excellent results. There is a high demand on the West Coast for these goats, and the fleece value (three to four dollars) offsets the shipping cost.



Boer goat



Kiko goat

The **Kiko** is a New Zealand breed selected for survival and growth rate. They are large-framed goats, excellent mothers, and very hardy. The does can wean 45-pound kids with no extra input, and have a high twinning rate. Kikos may be expensive and hard to find. Excellent foragers bred under tough conditions, they are being used successfully in grazing-for-hire businesses. Contact **Sylvia Tomlinson** (Meat Goats of Caston Creek) or **Dr. An Peischel** (Goats Unlimited), both listed under **Further Resources**, to learn more about Kiko goats.

Tennessee Woodenleg goats, also known as “Fainting Goats” and “Tennessee Stiff-legs,” are *myotonic*—their muscles become extremely stiff when they are frightened. The attack usually lasts 10 to 20 seconds, and if they are off-balance when it hits they may fall over. This hereditary condition makes the Tennessee Woodenleg very muscular. The breed originated with four individuals brought to Marshall County, Tennessee, in the early 1880s, and the population of the breed is small (**Gipson**, no date).

Tennessee Meat Goats originated from the “Fainting Goat,” but have been selected for heavier muscling and larger size. More information on the Tennessee Meat Goat is available at <http://www.tennesseemeatgoat.com>. However, even after selection, most Tennessee Meat Goats grow more slowly and mature to a smaller size than Boer, Kiko, or dairy goats. Several producers have crossed them with Boer goats to improve growth rate (**tatiana Stanton**, personal communication).

For pictures and further information on all these breeds and many more, see <http://www.ansi.okstate.edu/breeds/>. This website also includes contact information for various breed associations.

Whatever breed is chosen for the meat goat operation, strict culling will be necessary to maintain a productive and profitable herd. Emphasis on reproduction, growth rate, carcass quality, and ability to thrive in the environment will be rewarded.

MARKETING

There is currently a strong and increasing demand for goat meat. Domestic slaughter and imports continue to rise annually, and goat meat that was once exported to Mexico, Canada, and the Caribbean is now being consumed in the U.S. The meat is lean, and may appeal to health-conscious consumers, but the primary purchasers of goat meat are members of ethnic groups, especially Hispanics, Muslims, and various Caribbean and Asian peoples.

The U.S. Census Bureau projects that between 1995 and 2050, Hispanics will account for 57% of the immigration into the U.S., and that Hispanics will account for 25% of the U.S. population by 2050. The vast majority of Muslims in the U.S. reside in the area stretching from Washington, D.C. to Boston, Massachusetts. Most of the Caribbean immigrants live in Miami, Florida or New York City (Gipson, 1999). There are strong Asian, Hispanic, and Muslim populations on the West Coast.

SEASONAL DEMANDS

Peak demands for goat meat occur at Easter, on Muslim holidays, on the 4th of July, and at Christmas. A calendar of Muslim holidays can be found at <<http://www.ansci.cornell.edu/extension/meatgoat3.htm#cal>>. This helpful site includes preferred weights and types of goats for various holidays and ethnic groups, and illustrates how to plan breeding dates in order to produce kids for a special market. An abbreviated version of the holiday information from this site is presented in Table 1.

FARM GATE

If there are only a few kids to sell each year, and an ethnic population is nearby, “marketing” may mean simply finding one family who likes to have goat meat for the holidays or for a barbecue. Muslims may want to slaughter the animal on-farm for religious reasons. Some Hispanics may prefer on-farm slaughter as well. If the producer agrees to allow this, it will be help-

TABLE 1. ETHNIC HOLIDAYS AND THE SIZE OF KID PREFERRED FOR THE FEAST.

Holiday	Date	Size of Kid
Easter (Western)	March 30, 2002 April 20, 2003 April 11, 2004	20 to 50 pounds
Easter (Eastern or Greek)	May 5, 2002 April 27, 2003 April 11, 2004	20 to 50 pounds
Independence Day	July 4	20 to 35 pounds (older kids also accepted)
Caribbean holidays	August	60-pound bucks
Start of Ramadan (Muslim)	November 6, 2002 October 26, 2003	45 to 120 pounds, less than 12 months
Id al Fitr (Muslim)	December 5, 2002 November 26, 2003	45 to 120 pounds, 60 pounds optimum
Id al Adha (Muslim)	February 23, 2002 February 12, 2003	yearlings, blemish-free

Source: < <http://www.ansci.cornell.edu/extension/meatgoat3.htm#cal>>.

ful to provide a few amenities. These may include a hose hooked up to running water, buckets, a flat working surface, and a hanging arrangement (hooks and ropes) to suspend the carcass while skinning. Arrangements must be made for disposal of offal. Check state regulations for information about composting or burial.

OTHER OPTIONS

In addition to sales at the farm gate, there are several channels for marketing meat goats. These include auction yards, private buyers, processors, sales to restaurants or grocery stores, and sales to a marketing cooperative. Prices at auction yards have improved in recent years, but are still dependent on the buyers present. A commission is charged, and the price is out of the seller's control. There is no advertising cost, and this may be the most convenient way to market the animals.

Private buyers may come to the farm or accept delivery at some other location. They will be re-selling the animals to a consumer. The seller has more control over price, but perhaps less security in payment than with other methods of selling. Check out the reputation of the buyer, or ask to be paid in cash. Bargaining skills will be an asset in this type of transaction.

In certain areas, restaurants and grocery stores with an ethnic clientele will be interested in buying goat meat. A USDA- or state-inspected facility must be used for processing, and it may be a challenge to find such a facility that is willing to handle goats. It requires extra time, patience, and energy to coordinate the activities of processing, delivering live animals to the processor, marketing the carcasses or cuts, and delivering meat to the retailer. However, this system gives the seller more control over price, and therefore may result in higher profits.

MARKETING COOPERATIVELY

Another option for marketing meat goats is a pooled goat sale. One example of this type of



sale is the Missouri Pooled Goat Sale, held approximately three times a year. Organized by the Missouri Goat Marketing Committee, the sale is conducted by Equity Cooperative Livestock Sales Association of Baraboo, Wisconsin. Here's how it works: the Committee schedules the sale and establishes the delivery location. The producers call Equity and describe the numbers and types (dairy, meat, or angora) and classes (weights and age) of slaughter goats available. This is called "consigning," but it is *not* a firm commitment. The sale is held by live Internet auction at <<http://www.equitycoop.com>> on Thursdays. On Friday, producers call for sale results, and then have the opportunity to accept or reject the sale price. Therefore, no transportation costs are incurred unless the seller accepts the sale price. If the seller chooses to accept the price, they commit to delivering the goats to the delivery location on the following Tuesday. A grader will be present at the site to type, classify, and weigh the goats as they are delivered. This information is sent to Equity, and then the check is cut and mailed to the seller.

A per-head commission is deducted from the check. That amount will be set prior to each sale, and has been two dollars per head in the past.

Missouri producers have been very pleased with this type of sale, and report that its availability has resulted in improved prices at the local sale barns. Payment is prompt, and prices have been perceived as fair. If you are interested in this type of sale,



call Equity Livestock at 800-362-3989. Mr. Dave Johnson is in charge of the goat marketing, and can assist producer groups in setting up such a sale.

Individual producers may wish to organize into a marketing association to increase the options for marketing. For example, Equity requires a truckload (500 to 600 head) of market goats. Generally, other large buyers will also be more interested in a large uniform group of animals (lot), and will offer a better price for a lot than for an individual. Contact your local goat association and your Cooperative Extension Service to inquire about existing plans or for help in organizing.

TIPS FOR SUCCESS

Whatever marketing options you pursue, it is important to offer a quality product and to understand what the buyer prefers. For instance, if the buyer wants 45-pound kids, it will not pay to feed them to 80 or 90 pounds. Also, goats do not marble; extra fat is simply waste, and is very expensive to put on the goat and also expensive to remove from the carcass. To understand what the buyer wants—ask! Also refer to the ethnic calendar and specifications referenced above. Current market information may be found at <<http://sheepgoatmarketing.org/sgm/index.html>>. See **Further Resources** (below) for other websites and publications that will help you to improve your marketing skills. The articles by Tatiana Stanton are particularly informative.



Nubian kid

BREEDING STOCK

In addition to marketing meat, there is an opportunity to sell the highest-quality kids as breeding stock. This will require good records, research into what breeds are in demand in your area, and skill in advertising. It will also be necessary to have a *realistic* idea of what breeding stock are worth. Caution is highly recommended: the price of breeding stock should be related to the price of the meat animal. According to Charles Bubl, “The rule of thumb in south Texas is that a buck of good lines should cost about five times what a slaughter kid is worth” (Bubl, 1996). Martin Farris of Double M Meat Goats points out that sires that produce fast-growing kids are worth more to the producer. (Farris, 2001).

GRAZING FOR HIRE

Besides meat and breeding stock, a third potential product of meat goat herds is the *service* of grazing for vegetation management. For example, Dr. An Peischel runs a grazing business in California using Kikos to control brush to aid in fire control; another goat grazing business is Ewe4ic Ecological Services, run by Lani Laming in Wyoming (Bingham, 1999). (See **Further Resources** for contact information.) Goats can effectively control kudzu, leafy spurge, multiflora rose, knapweed, and many other problem plants. The goats reduce the need for herbicides; increase the diversity of pasture plants, especially grasses; add fertility to the soil; and are able to control weedy areas that are difficult to treat with other methods. For example, steep slopes on water reservoir dams, utility rights-of-way, and fire breaks near urban areas may benefit from the use of goats to control vegetation.

There are no standard rates; each contractor must investigate the individual situation and write a bid for each project, based on anticipated costs and desired profit (Triumpho, 2001). Ma-

A word of caution is in order: goats need good nutrition in order to be productive. If they are being used as land-clearing tools, the producer may need to provide supplemental feed or accept lower weight gains.

major factors to consider before attempting to contract your goat herd for land reclamation or fire control services include:

- A competent and reliable herder to oversee the animals and make decisions on when to move them
- Sufficient temporary electric fencing to confine the animals to an area
- Dogs for herding and for guarding
- Transportation costs
- Costs of alternative (competing) methods—chemical, mechanical, or controlled-burn

MULTISPECIES GRAZING

Goats make a valuable contribution to maintaining the productivity of the pastures they graze, particularly when used in a multispecies grazing scheme. Many cattle producers have found that adding goats to their farm or ranch increases profits while improving pastures. Meat Goat Specialist Jean-Marie Luginbuhl of North Carolina State University believes that “you can add one or two goats per head of cattle without reducing beef production.” Goats and cattle do not normally share parasites, and goats consume plants that cattle avoid. This increases the amount of grass available for the cattle, as the suppression of brush allows more grass to grow (Kidwell, 2000).



CASE STUDY 1

Running RR Ranch, Linn Creek, Missouri

The following story is a condensed and slightly edited version of an article published in sheep! magazine, June/July 2001. The author is unknown.

In 1992 Charles Reed of Linn Creek, Missouri, bought some goats to help control brush on his farm. The goats did that job, and more. Reed found that the goats fit in perfectly with his beef cattle operation and increased the productivity of his farm without costing anything. Reed and his wife, Randy Jane, run 100 beef cows and 500 meat goat does on their place today. They have 300 acres of pasture land and another 150 acres of woodland that is grazed. Much of the farm is hilly, rugged uplands with a lot of brush covering. It is typical Missouri Ozarks land and perfect goat country.

On this farm, Charles Reed has discovered, the goats eat for free. “You can run one to three does for each cow-calf unit and not change the stocking ratio,” he said. The goats don’t take feed away from the cattle. Instead, they eat the rough forage that cattle don’t eat, and create better pasture with more grass for the cattle. The kids produced by the goat herd add another 100 pounds or more net production to every stocking unit, he said. It works out about the same as if you were taking a 450-pound calf at weaning and adding another 150 to 200 pounds to the weight of that animal.

“They really work as brush-clearers,” Reed said. “They will clear a place. It is not something that happens overnight, it may take a couple of years, but the job gets done.” Major brush problems on the Reeds’ place were multiflora rose, thorny locust, and oak sprouts. The goats find all those plants delicious. They will also

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control cedar, which can be a pest, but it takes longer, he said. (Cedar is not one of their favorite foods.) There is a lot of oak on the land. The does flush* on acorns in the fall—those acorns are their fall protein boost. The goats fight the deer and the squirrels for the acorns, Reed said.

The goats graze year-round. There is no man-made shelter for them, although they do make good shelter use of cedar thickets on the property. The 350 acres of pasture land are improved native pasture with fescue and some legumes. Reed said he does no supplementary feeding for the does. He sometimes uses a creep feeder for the kids in late summer if the forages get short. It is sometimes dry in August and September and the kids need the extra feeding, he said.

The Reeds use Great Pyrenees dogs for predator control. There are six dogs on the farm now and they stay with the goat herd. Most of the fencing on the farm is electric. Three to four wires works well for the goats.

Kids are born on the farm in April and May. Buck kids are banded to castrate them at birth. This is a management practice, not something required by the market, Reed said. They just aren't interested in trying to cope with several hundred intact, half-grown bucks in the fall. They do not disbud kids. They leave the horns on.

Reed said the markets for kid goats have improved since he started with the animals in 1992. "When we started, we hauled the kids to the auction in New Holland, Pennsylvania," he said. "That was the place to get good prices for goats. Now even the local goat auctions in this area are bringing good prices. It hardly pays to truck them any more."

(The complete article may be found in *sheep!* magazine, June/July 2001, p. 16. More meat goat information is also included in that issue.)

*flush — to gain weight before breeding. This increases ovulation rate, which should increase the number of kids born.



STOCKING RATE

It is generally believed that six mature goats equal one cow on improved pastures and that ten goats equal one cow on browse or brushy areas. When grazing brush, it may be necessary to adjust stocking rates in order to accomplish your objectives. For example, when starting out with a very brushy area it might be desirable to stock two to four goats, or more, per acre. Later, as the brush disappears, some goats may need to be sold while a few (one-half to one goat per acre) are kept to control regrowth (Hart, 2000).

These figures depend on the carrying capacity of the land. Observation and adjustment are necessary. Some producers, including Mr. Jim Willingham of 8 Mile Ranch near Uvalde, Texas, choose to allow the goats to harvest the brush as forage and maintain it as a renewable resource, rather than attempting to kill it.

FEEDING MEAT GOATS

In order to raise goats at a low cost, the producer must maximize the use of forage. Please refer to the [Sustainable Goat Production: Overview](#) for general information on pasturing goats.

Feeding of goats cannot be discussed without mentioning the impact of the kidding cycle. Most goats are seasonal breeders, beginning to cycle with the shorter and cooler days of the fall. They will continue to cycle (unless they are bred) every 21 days or so, until days lengthen in late January or February. Since the gestation period is 150 days, this means that goats bred

in September will kid in February, while delaying breeding until late November would mean that kids arrive in late April and in May. The time of kidding determines the period of highest nutritional demand, as late pregnancy and early lactation are critical times for the doe and kid. By manipulating the breeding date, the producer can see to it that those peak needs hit when more forages are available, rather than during months when only harvested feed can be used.

Caution: underfeeding during critical times is *not* a profit-making idea! Neither is feeding large amounts of purchased feed. It behooves the manager to plan the production cycle to avoid both these pitfalls. Be aware of the pattern of forage availability in your area, and try to use pasture or browse as much as possible.

In addition to pasture or browse, it may be necessary at some times of the year to supple-

TABLE 2. DIETARY PROTEIN AND ENERGY REQUIREMENTS OF GOATS*.

Class of Goat	Avg. feed intake/day, lb ¹	% Crude Protein	% TDN ²
Growing doeling, 45 lb ^a	2.4	8.8	56
Growing male kid, 66 lb ^b	2.9	9.0	57
Yearling doe, 90 lb ^c	4.6	10.0	56
3 yr. old doe, 110 lb ^d	5.0	11.7	69
Mature buck, 220 lb ^e	5.3	9.0	55
Dairy doe, 150 lb ^f	7.5	11.6	71

*Approximations; based on dry matter in the feeds eaten
¹Calculated on basis of the dry matter in the feeds eaten
²TDN = Total Digestible Nutrients
^aGrowing at the rate of .25 lb/day
^bGrowing at the rate of .33 lb/day
^cYearling female, last trimester of pregnancy and growing
^dMilking 2 qt/day - enough for twins
^eNot gaining weight, moderate activity
^fNubian, milking 1 gallon/day of 4.0% butterfat
 Source: Pinkerton and Pinkerton, 2000

ment goats with extra protein and/or energy. To do that efficiently, it is important to understand the requirements of the animal and to meet those needs in the most cost-effective manner. The following information is from "Supplemental Winter Feeding of Goats," by Drs. Frank and Bruce Pinkerton. The entire article is located at <<http://goats.clemson.edu/winter%20feeding.htm>>.

The Pinkertons simplify feeding decisions by grouping animals into categories, as shown in Table 3.

TABLE 3. PRACTICAL DIETARY RECOMMENDATIONS FOR FEEDING GOATS.

	% protein	% TDN
Growing kids, dry does, and bucks	9 - 10	54 - 58
Pregnant goats	10 - 11	56 - 60
Lactating goats	12 - 13	62 - 68

Source: Pinkerton and Pinkerton, 2000

"During the warm-season grazing period," write the Pinkertons, "goats will very likely meet all their nutritional requirements from whatever combination of forages is available; only a trace mineralized salt and possibly some phosphorus would be needed in addition."

However, in late fall and winter you will probably need to supplement. Here are some options recommended by the Pinkertons, based on their experiences:

- 1) Provide a few hours of grazing on ryegrass or small-grain pastures.
- 2) Offer grass hay ad lib plus 1 pound of 20% protein pellets daily. (Check protein content of hay: if hay is 10-11% protein, reduce pellet to 16% protein or feed only ¾ pound/day of the 20% pellet.)
- 3) Feed higher-protein hay (12-13%) ad lib, and provide ½ pound of corn/head/day for pregnant or lactating does. (May need to feed 1 pound/head/day in some cases.)
- 4) For kids 3-6 months old, use 1 pound of 16% protein feed plus grass hay. Older kids can have grass hay plus 1 pound of 14% protein feed.

Using these figures, a producer can estimate feed costs. For example, if you plan to begin with 25 does, and in your environment it is typical to feed hay for the months of December, January, February, and March, then it is possible to calculate feed needed for the season:

120 days x 26 goats (does plus buck) x 5 pounds (approximate dry matter required) = 15,600 pounds.

This is on a *dry matter* basis. Convert that figure to *as fed* basis by dividing by 0.9, since hays are typically about 90% dry matter. 15,600 divided by 90% = 17,333 pounds of hay.

Goats are notoriously wasteful; add on about 20% to allow for waste, which brings the total amount of hay needed to approximately 20,800 pounds, or 10 tons. If bales are 60 pounds each, then each goat will be eating about 13 bales over the course of the winter. Now, how much do bales cost in your area? Price several sources and convert the amount of hay needed to a cost. In my (fictitious) example, if I were buying hay for \$90/ton, and dividing that cost over the 25 does, I would already have \$36 feed cost per doe.

A word of caution concerning hay: price is not the only consideration. Goats are choosy, and will refuse hay that is not palatable. Look for bright green, leafy, sweet-smelling hay that is free of molds. Gathering a core sample and having it analyzed at a forage testing laboratory is an excellent idea, and will give you vital information for determining the feeding program.

Next, calculate the number of pounds of protein supplement that will be needed for the year. (Remember that this is dependent on the hay's protein content. It's a good idea to do this exercise using various scenarios, in order to find the most cost-effective option.)

120 days x 26 goats x 1 pound/day = 3,120 pounds protein supplement for the winter season

Convert that figure to a cost as well. If energy supplementation is needed as a result of the type of hay used, calculate the number of pounds needed, and the cost.

There will be other costs, such as fencing, pasture expenses, salt, and minerals. Individual situations will vary tremendously when it comes to fencing and pasture expenses, depending on whether or not there is an existing fence that can be modified inexpensively. If ample browse is available, there may not be any pasture expense. To figure a cost for salt and minerals, read a feed tag for "suggested consumption," multiply by 365 days and by the number of goats consuming the supplement (don't forget, the kids will be consuming some for several

months as well.) For goats, it is best to feed loose mineral; cattle mineral will work, while sheep minerals do not have adequate copper content. Goats need more copper than sheep do. "A suitable level for ration formulation is 10 ppm" (Smith and Sherman, 1994).

Salt may be fed as a block or loose, or mixed with the feed at 0.5% of the complete-ration dry matter. However, according to Dr. Mary Smith, "When salt is used as a vehicle for trace minerals or medicaments and is fed free choice, it is important that the goat have no other source of sodium (plain salt or bicarbonate of soda) to satisfy its cravings. Goatkeepers who offer a smorgasbord of supplements are ascribing greater nutritional wisdom to the goat than it actually possesses" (Smith and Sherman, 1994).

Finally, when feeding goats it is very important to observe closely and adjust feeding practices based on how the animals are doing. A

A word of caution concerning hay: price is not the only consideration. Goats are choosy, and will refuse hay that is not palatable.



ration that looks adequate on paper may turn out to be unpalatable, or may need to be increased due to severe weather conditions, or may be overly generous if the goats are finding plenty of browse. A properly nourished animal will be healthier, and more able to handle stress and bad weather. An over-fat animal will have a whole set of problems, and will be a drain on the budget as well.

Some areas of the country need selenium supplementation. Check with your local Extension agent, your veterinarian, or goat producers in your area about selenium status. Excess levels are toxic.

PROFITABILITY

One of the key questions to answer before starting an enterprise is, “Will it be profitable?” The answer will largely depend on the management and the set of individual circumstances. Many sample budgets have been published, and they are useful in helping sort out the various categories of expenses that must be considered. As stated previously, meat goats are not a get-rich-quick scheme.

There are some basic principles to keep in mind that will improve the chances for profit. In his article entitled “Experiencing Long-Term Success as a Meat Goat Producer,” [Dr. Rick Machen](#) of Texas identifies four fundamental conditions for success in a livestock enterprise:

- 1) Must have a viable market for your product.
- 2) Market price must exceed cost of production.
- 3) The goal for reproductive performance is at least one merchandisable unit per exposed female. (An admirable goal for an extensive system would be 1.5 kids weaned for every doe bred.)
- 4) Match genetic potential for growth with productivity of the environment.

[Dr. Machen](#) includes a table (reproduced here as [Table 4](#)) to illustrate the relationship between cost of production and reproductive performance. Clearly, the chances for profitability are far better if costs are kept low *and* does are productive and kids survive.

TABLE 4. RELATIONSHIP BETWEEN COST OF PRODUCTION AND REPRODUCTIVE PERFORMANCE.

Doe Cost (\$/hd/yr)	Kid Crop Weaned						
	70%	80%	90%	100%	125%	150%	200%
	Breakeven Price, \$/lb*						
10	0.32	0.28	0.25	0.22	0.18	0.15	0.11
15	0.48	0.42	0.37	0.33	0.27	0.22	0.17
20	0.63	0.56	0.49	0.44	0.36	0.30	0.22
25	0.79	0.69	0.62	0.56	0.44	0.37	0.28
30	0.95	0.83	0.74	0.67	0.53	0.44	0.30
35	1.11	0.97	0.86	0.78	0.62	0.52	0.39
40	1.27	1.11	0.99	0.89	0.71	0.59	0.44
45	1.43	1.25	1.11	1.00	0.80	0.67	0.50
50	1.59	1.39	1.23	1.11	0.89	0.74	0.56
60	1.90	1.67	1.48	1.33	1.07	0.89	0.67

*Assumed market weight: 45 lbs. Does bred to kid once a year.

Source: <<http://www.boergoats.com/articles/meatgoatproduction001.htm>>.

Referring to the example we used above in calculating cost (**Feeding Meat Goats** section), it is easy to see the impact of a winter hay bill of \$35 per doe. By the time all costs were calculated, it would be necessary to have a highly productive and healthy herd in order to show a profit. Contrast that example to Charles Reed, the producer profiled in the case study above, who states that he doesn't offer any supplemental feed to the does, and runs his does with the cattle. Consider ways that you can reduce costs in your situation, while still maintaining productivity of the herd. For example, perhaps by breeding later, your pregnant does can meet most of their needs from spring pasture rather than winter hay. Reducing the herd's nutritional needs for the period from December to March will enable you to maintain the herd on less feed. If you are forced to kid earlier than March, the best option is to figure out some cheaper ways to supplement the herd; for example, in some climates, winter grazing can be provided more cheaply than hay. If our fictitious producer could feed hay only 40 days instead of 120, expenses would be cut dramatically. Be aware that it does no good to skimp on feed during the times of high nutritional demand; the result will be fewer and weaker kids, reduced milk, more health problems, and fewer pounds of kids to market. After estimating your feed costs based on the nutritional requirements of your herd during the winter, the cost of meeting those needs, and the number of days you will probably require supplementation for your herd, study the table above to figure out the productivity needed to make a profit in your situation.

Further suggestions for improving the odds of success include:

- 1) Start with good-quality, healthy breeding stock.
- 2) Avoid high-dollar stock until you have gained experience. This lowers risk as you will inevitably make many mistakes during the first year or two. Don't buy more than you can afford to lose, and don't borrow money to learn the business.
- 3) Keep expenses to a minimum. This is accomplished by using forages as much as possible, keeping equipment simple, and

using the services of a veterinarian to set up a preventive health care plan. (Investigate the possibility of grazing land you don't own.)

4) Maximize income by maximizing the number of animals for sale. This means concentrating on reproductive efficiency (kid crop born) and on keeping the kids alive and well through good nutrition, health care, and predator control.

5) Pay attention to marketing!

SAMPLE BUDGETS

Sample budgets are included here to assist the prospective producer in planning and in determining feasibility. Remember that costs are subjective and depend greatly on management and location. Your situation will not correspond exactly to anyone else's.

Dr. Lynn Harwell presents an excellent discussion of the financial outlook of the meat goat business, at <http://goats.clemson.edu/NC%20Handbook/analysis.htm>. The article includes a sample budget (along with discussion of how it could be made more attractive) and thought-provoking questions. In his example, the goats are calculated to need three pounds of hay for 120 days at \$80/ton, and ½ pound concentrate for 100 days at \$185/ton. When these costs are added to the other variable costs, the total is about \$42 per doe. To that figure, a cost for land and for interest on capital expense must be added. That brings the total cost figure to \$60. Revenues are then calculated on the basis of a 150% kid crop. Market kids are sold for \$40, breeding stock for \$65, and culls for \$55. Total revenues per doe: \$76.

The following sample budget is from Langston University in Oklahoma; it was included in "Sustainable Brush Control" by Steve Hart, published in the proceedings of the Fifteenth Annual Goat Field Day in 2000. Dr. Hart writes, "While goats can be profitable, they are not the way to riches. The secret to making money with goats is to spend a minimum amount of money in producing them. Direct sales of animals can also enhance profitability."

Income

Sell 1.25 kids/doe (1.5 kidding rate - .25 for replacement)	
Price \$.80/lb., 50 lb., \$40/kid	
Income/doe (1.25 kids x \$40)	\$50.00
Income cull does .2 hd x \$25	5.00
Weed and brush control (save in spraying)	??????
Total income	\$55.00
Expenses	
Pasture	\$5.00
Fencing	4.00
Health (vaccination & deworming)	4.00
Buck service	3.00
Raising replacement	10.00
Salt and water	2.00
Winter feeding	10.00
Predator control	2.00
Total expenses	\$40.00
Profit / doe	\$15.00

Another budget ([Table 5, facing page](#)) was developed by the Department of Agricultural Economics, Oklahoma State University, and presented in the article "Goat Farm Budgeting" by Roger Sahs in the Proceedings of the Fourteenth Annual Goat Field Day. It includes blanks, to encourage producers to research their own estimated costs.

Another enterprise budget (tailored for Minnesota producers) is found at <http://www.auri.org/research/goatmeat/budget.htm>. This budget is in worksheet format for the convenience of the user. You must carefully evaluate the assumptions and calculations in any budget to determine the accuracy for your situation.

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TABLE 5. MEAT GOATS, 100 HEAD UNIT, MARGINAL LAND WITH HEAVY BRUSH/WOODLANDS GRAZING, PER-DOE BASIS.

Operating Inputs					
	Units	Price	Quantity	Value	Your Value
Grain	cwt.	3.60	1.288	4.64	_____
Alfalfa hay	tons.	90.00	0.1	9.00	_____
Vet medicine	hd.	1.50	1	1.50	_____
Salt and Minerals	lbs.	0.08	10	0.80	_____
Marketing expense	hd.	2.00	1.256	2.51	_____
Annual operating capital	\$	0.088	6.0338	0.533	_____
Machinery labor	hr.	6.50	0.787	5.11	_____
Equipment labor	hr.	6.50	0.57	3.71	_____
Livestock labor	hr.	6.50	1	6.50	_____
Machinery fuel, lube, repairs	\$			5.32	_____
Equipment fuel, lube, repairs	\$			2.01	_____
Total Operating Costs				41.63	_____
Fixed Costs			Amount	Value	Your Value
Machinery:	Interest at 9.45%		11.8	1.11	_____
	Depr., taxes, insurance			2.38	_____
Equipment:	Interest at 9.45%		77.99	7.37	_____
	Depr., taxes, insurance			8.35	_____
Livestock:					
	Doe goat		62.25	_____	_____
	Buck goat		4.50	_____	_____
	Replacement doe		15.00	_____	_____
	Interest at 9.45%		81.75	7.73	_____
	Depr., taxes, insurance			5.70	_____
Total Fixed Costs				32.64	_____
Production					
	Units	Price	Quantity	Value	Your Value
Male kids	hd.	60.00	0.65	38.88	_____
Female kids	hd.	55.00	0.45	24.64	_____
Cull does	hd.	50.00	0.16	8.00	_____
Total Receipts				71.52	_____
Returns above total operating cost				29.89	_____
Returns above all specified cost				-2.76	_____
Returns above total operating cost					
4% doe death loss, 144% kid crop 10% kid death loss, 20% doe replacement rate					

Source: Sahs, 1999

CASE STUDY 2

Smoke Ridge Ranch, Choteau, Montana

In closing, the following information is shared by Yvonne Zweede-Tucker, a Montana rancher and goat enthusiast. The story of her Smoke Ridge Ranch illustrates goat production in a western environment.

“Their love for noxious weeds gives us an advantage in raising meat goats in North-Central Montana, in spite of the challenges of cold, wind, and drought that Mother Nature throws at us, and our distance from chevon (goat meat) consuming populations,” says Craig Tucker. Craig and his wife, Yvonne Zweede-Tucker, own and operate Smoke Ridge, a meat goat breeding operation 13 miles north of Choteau, Montana. “Noxious weeds are a significant and increasing problem for cattle graziers in the Northern states, and the goats offer one solution to the ecological challenge. In recent decades, as sheep numbers have declined in Montana, weeds, brush and forbs have proliferated. Because cattle prefer grasses to brush and weeds, woody or thorny plants like multiflora roses and bitter weeds like knapweed and spurge have multiplied. The goats will walk (or rather, run!) through belly-deep grasses to demolish a wild rose bush and will consume knapweed flowerheads with gusto, essentially stopping the spread of the seeds.”

Craig is the Junior High School Mathematics teacher at Choteau, and Yvonne also has a “day job,” custom-manufacturing bedding and home décor items for upscale furniture stores and interior decorators in Montana and the Northwest. “They say one has to diversify to survive in Montana,” laughs Yvonne, “we just do it three ways!” Their “summer” herd of nearly 1,000 does and kids are increasingly away from home during the summer months, one group to a nearby ranch and another group within Smoke Ridge’s own Teton County. Both the privately-owned ranch and the county get the benefit of the goats’ weed control in return for allowing them to browse on the high-protein weeds, giving Smoke Ridge fast-growing kids and mother goats ready to breed back in the early winter for another “kidding season” the following May. “There are paid-to-graze programs going on all across the country,” explains Yvonne, “but as both the ranch and our county are doing a lot of the work involved with the weed programs, we’re more comfortable with a feed-for-weed-control swap.”

“Other than weather extremes, with winter temperatures dipping past 30 degrees below zero (without calculating wind chill!) and ongoing drought putting a crimp in hay supplies, one of our challenges is the fact that we’re producing a meat that is in large demand—thirteen to twenty-four driving hours away.” Yvonne goes on to explain what Smoke Ridge and partnering goat ranches are doing to gain economy of scale and beat the high cost of transportation. “We and the dozen or so ranches that have started raising meat goats with our breeding stock are partnering up so that we have the volume, and increasingly, the consistency of product that meat goat buyers want. This way, we can take a full load of 150 animals on a 24-foot double-decked gooseneck trailer to the Pacific Northwest, and fill a quad-decked semi with up to 700 goats for the buyer in California. We don’t have any formal organization, we just cooperate, with the hope and objective that all participants are better off working together than they would be on their own.”

A year at Smoke Ridge starts with breeding. Target start date is Thanksgiving weekend, when one buck is turned in with each specifically selected group of does. A group will range from 15

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to 135 females, (usually 85–90) and the buck is responsible for covering all of them within the four-week period. After Christmas, all bucks are taken from their groups, all does are put back together, and a “clean-up” buck is given one to two additional weeks to catch any does that still come into heat. “We know exactly which does were with which buck, and after kidding is over at the end of May or beginning of June, we know which doe kidded to the main buck she was exposed to or if she was caught by the clean-up buck,” Craig explains. “Any buck who ‘misses’ more than a few of his girls will more than likely be enjoying a trailer ride to a goat-meat-consuming population center.”

The goats are fed hay, straw, and whole corn throughout the winter months to give them the protein, energy, and roughage they require for maintenance and gestation. Mineral is always available, as is fresh water and shelter. As the pastures become grazable in the spring, the stored feed is tapered off until the now heavily pregnant does are feeding themselves. Then the onslaught of kidding starts, with a trickle of kids for a few days, then a rush as up to a third of the drop is born within a few days, and then the calmer final two weeks. The kids start travelling with their mothers out to pasture and back to the night-shelters within a few days, and then start to play “wave” in groups of up to eighty kids, running at full tilt to an unspecified spot some distance away, and then back to where they started. Cleated A-frames and wooden power-line spools provide hours of climbing and jumping pleasure for the goats and viewing pleasure for their owners.

Away on weed-control projects for the majority of the summer and into the fall if possible, the goats are brought back to Smoke Ridge’s 220 acres by mid-October. The wethers (neutered male kids) are sorted off to go for slaughter, and the does, doe kids, and bucks that are being sold to other ranches as breeding herds are delivered across the U.S. The does and doe kids that will be used by Smoke Ridge to make the next generation of meat goats are evaluated and decisions are made regarding which breeding groups will be formed.

Smoke Ridge started in 1991 with pure Spanish does and Cashmere bucks. Breeding for and harvesting the cashmere (through annual shearing) has given way to a stricter focus on production of quality slaughter kids in the harsh Montana environment. Yearling does are targeted to produce one kid, and two-year-old-plus does two or more kids, all to be raised on brush and weeds to slaughter weight of 50 to 70 pounds by six months. “All of our goats have the cashmere undercoat which makes them more fuel-efficient and thus more able to survive and reproduce in spite of our cold winter temperatures, but we had to choose a primary focus and simplify our breeding objectives. We’re crossbreeding the Boer breed of meat goat, developed in South Africa, with the Spanish does to add carcass quality, but production remains the key. Getting an 80-pound kid is great, except if it’s a single from a mature doe who normally gives us two 60-pound kids,” Yvonne says. “We want to keep the survivability, longevity, and fantastic maternal traits of the Spanish goat while adding some additional muscling.” Even before Boer influence was added, the Smoke Ridge Spanish goats didn’t look like their grandmothers anymore. “Our goats are wider and slightly lower than what you’ll find in a typical Spanish goat. By keeping records, ear-tagging all progeny, and selecting exclusively for production for years, we’ve started getting a specific body type.”

Guardian dogs see to it that the goats are in no danger from predators. Maremmas, Anatolians, and Maremma-Anatolian crosses stay in the pastures year-round and ensure that the coyotes,

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eagles, foxes, ravens, and badgers choose a food group other than goat. The dogs clean up afterbirths that the does do not consume, and stay with sleeping kids and solitary does in labor.

Electric fencing (aluminum-clad) defines the goats' permanent pastures, and portable poly-wire with tread-in posts simplifies the task of allocating a portion of larger pastures. Three-sided sheds (16' long, 8' deep and 4' high, open to the south) have only recently been joined by a barn as the goats' sole shelter. Yvonne says, "The goats will bed down outside if it's snowing, and in the morning you'll have dozens of snow-covered lumps with goat heads sticking out of them, chewing their cud; but if it rains, they're under the roofs!" They also hate having to walk through or in water, preferring to use a board or bridge to cross anything they can't jump (2 to 3 feet wide or more).

Smoke Ridge is in the goat business for the long haul and continues to look forward to each "next year." "When I first did the business plan to get goats, in 1990," Yvonne remembers, "I loved the idea that the meat was in short supply, the cashmere was in short supply, and that the weeds that the goats prefer to eat were a real and increasing problem...but I had no idea how much we would come to love them. They are so much fun, and not just when they're little. They are affectionate, playful, and sometimes too smart. They have a really strong herd instinct—where one goes, they all go. They don't share very well, either food or your attention, but if you treat them with respect and kindness, they are very easy to work in sorting facilities and to load and transport."

(Personal communication, Yvonne Zweede-Tucker, 2002)

FURTHER RESOURCES

Many states have Extension publications about meat goats. Check with your local or state Extension office for titles available in your state.

Websites

This is not a complete listing of meat goat resources on the internet, but it will get you started. These sites all include links to other meat-goat sites.

Dr. Tatiana Stanton has written an excellent series of articles and fact sheets that are very helpful to prospective and experienced producers. These may be found at the Cornell website:

Starting a Meat Goat Operation
<http://www.ansci.cornell.edu/extension/marketfact1.html>

On-farm Marketing of Slaughter Goats
<http://www.ansci.cornell.edu/extension/marketfact2.html>

Marketing Slaughter Goats Through Livestock Market Auctions
<http://www.ansci.cornell.edu/extension/marketfact3.html>

Ethnic Calendar
<http://www.ansci.cornell.edu/extension/meatgoat3.html#cal>

Empire State Meat Goat Producers Association
<http://www.ansci.cornell.edu/extension/esmgpa.html>



Dr. Frank Pinkerton and Dr. Bruce Pinkerton have published some very helpful articles on the Clemson website:

Goat Droppings

<http://goats.clemson.edu/>

Meat Goat Production and Marketing Handbook

<http://goats.clemson.edu/NC%20Handbook/index.htm>

Housing, Fencing, Working Facilities, and Predators

<http://goats.clemson.edu/NC%20Handbook/housing.htm>

Managing Forages for Meat Goats

<http://goats.clemson.edu/NC%20Handbook/forages.htm>

Supplemental Winter Feeding of Goats

<http://goats.clemson.edu/winter%20feeding.htm>

Enterprise Analysis by Dr. Lynn Harwell:

<http://goats.clemson.edu/NC%20Handbook/analysis.htm>

Enterprise Budget: The Feasibility of Meat Goats in Minnesota by Dr. Jay Lillywhite

<http://www.auri.org/research/goatmeat/budget.htm>

North Carolina State University maintains a site with many useful materials on meat goats:

<http://www.ces.ncsu.edu/lenoir/staff/jnix/Ag/Goat/>

The Maryland Sheep and Goat Website:

<http://www.sheepandgoat.com/>

For those interested in Boer goats:

<http://www.boergoats.com/>

<http://www.jackmauldin.com/>

<http://www.goatrancher.com>

(Caution: be very wary of expensive breeding stock. Remember the emu business!)

Tennessee Meat Goats:

<http://www.tennesseemeatgoat.com>

Kikos:

<http://www.home.inreach.com/kiko/>

Comprehensive resource on goat breeds, with pictures and contact info for various breed associations:

<http://www.ansi.okstate.edu/breeds>

Equity Livestock Auction

<http://www.equitycoop.com>

Fundamentals of marketing goats:

<http://www.sheepgoatmarketing.org/sgm/fundamentals.htm>

Experiencing Long-Term Success as a Meat Goat Producer by Dr. Rick Machen:

<http://www.boergoats.com/articles/meatgoatproduction001.htm>

Magazines

Goat Rancher

<http://www.goatrancher.com>

Terry Hankins, editor and publisher

731 Sandy Branch Road

Sarah, MS 38665

662-562-9529

\$25/year, 12 issues.

Dairy Goat Journal

Doris and Dave Thompson, editor and publisher

Duck Creek Publications, Inc.

P.O. Box 10, 128 E. Lake St.

Lake Mills, WI 53551

\$21/year, nine issues. Focused on dairy goats, as the title implies, but contains some information on meat goats as well.

Ranch and Rural Living and Meat Goat News

P.O. Box 2678

San Angelo, TX 76902

915-655-4434

\$25/year, 12 issues; \$48/year for both publications.

Publications of the Texas Sheep & Goat Raisers' Association.

The Goat Farmer

Capricorn Publications LTD

P.O. Box 641

Whangarei, New Zealand

e-mail: thegoatfarmer@caprine.co.nz

<http://www.caprine.co.nz>

U.S. \$26.00 per year, four quarterly issues. An excellent publication, with scientific and holistic articles covering management, feeding, and breeding for all types of goats – meat, fiber, and dairy.

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The electronic version of **Sustainable Goat Production: Meat Goats** is located at:
HTML
<http://www.attra.ncat.org/attra-pub/meatgoat.html>
PDF
<http://www.attra.ncat.org/attra-pub/PDF/meatgoat.pdf>